

# ABOUT THE PROJECT

- **Project Title:** Liverworts and Hornworts Flora of Darjeeling District, West Bengal
- **Executing official:** Dr. Monalisa Dey
- **Duration of the project :** 2016–2021
- **Objectives:** Documentation of the Liverworts and Hornworts of Darjeeling district of West Bengal along with taxonomic description, illustration, nomenclature, specimens examined, a note on their habitat preferences and an identification key for easy identification of the taxa



# TOURS

Sl. No.	Duration	Field Nos. used	Area covered
1.	31 <sup>st</sup> August 2016–9 <sup>th</sup> September, 2016	121	Darjeeling, Lloyd's Botanical garden, Ghum, Tiger hill, Lepchajagat, Takdah, Tinchuley.
2.	25 <sup>th</sup> February 2017–11 <sup>th</sup> March, 2017	195	Kalimpong, Sillery gaon, Damsang Valley, Pedong, Rishi Khola, Rishyap, Kolakham, Lava, Loleygaon.
3.	31 <sup>st</sup> March 2018–13 <sup>th</sup> April 2018	146	Suntalekhola, Mouchuki forest, Khambuhang, Todey, Paren, Rongo forest, Dalgaon, Jhandi, Charkhole, Nimbong, Barbote, Chuikhim.
4.	4 <sup>th</sup> March 2019–16 <sup>th</sup> March, 2019	108	Jogighat, Sittong, Mangpoo, Ranju Valley, Ahaldara, Latpanchar, parts of Mahananda WLS, Bara Mangwa, Chatakpur forest, Kalej Valley.
5.	28 <sup>th</sup> October 2019–9 <sup>th</sup> November, 2019	98	Mirik, Okayti, Simana, Jorepokhri, Bungkulung, Kurseong, Bagora, Chimney, Sonada, Senchal forest.

# METHODOLOGY

- Study of protologues, relevant taxonomic literature and Type specimens obtained on loan from other herbaria for identification of taxa.
- Olympus SZ 70 Stereo zoom binocular microscope was used for dissection of plant specimens.
- Olympus CX 41 bright field trinocular biological research microscope with a drawing attachment was used for making illustrations and for microphotography.

# IDENTIFICATION OF SPECIMENS

Identified 214 specimens belonging to **56** species collected by myself from Darjeeling District, West Bengal

Sl. No.	Name of the Species	Family
1.	<i>Acanthocoleus gilvus</i> (Gottsche) Kruijt	Lejeuneaceae
2.	<i>Cololejeunea latilobula</i> (Herzog) Tixier	Lejeuneaceae
3.	<i>Cololejeunea longiana</i> Grolle & Mizut.	Lejeuneaceae
4.	<i>Cololejeunea serrulata</i> Steph.	Lejeuneaceae
5.	<i>Cololejeunea trichomanis</i> (Gottsche) Steph.	Lejeuneaceae
6.	<i>Cheilolejeunea trapezia</i> (Nees) Kachroo & R.M.Schust.	Lejeuneaceae
7.	<i>Colura tenuicornis</i> (A.Evans) Steph.	Lejeuneaceae
8.	<i>Drepanolejeunea erecta</i> (Steph.) Mizut.	Lejeuneaceae
9.	<i>Drepanolejeunea fleischeri</i> (Steph.) Grolle & R.L.Zhu	Lejeuneaceae

# IDENTIFICATION OF SPECIMENS

Sl. No.	Name of the Species	Family
10.	<i>Drepanolejeunea herzogii</i> R.L.Zhu & M.L.So	Lejeuneaceae
11.	<i>Lejeunea anisophylla</i> Mont.	Lejeuneaceae
12.	<i>Lejeunea curviloba</i> Steph.	Lejeuneaceae
13.	<i>Lejeunea flava</i> (Sw.) Nees	Lejeuneaceae
14.	<i>Lejeunea obscura</i> Mitt.	Lejeuneaceae
15.	<i>Lejeunea tuberculosa</i> Steph.	Lejeuneaceae
16.	<i>Leptolejeunea balansae</i> Steph.	Lejeuneaceae
17.	<i>Leptolejeunea elliptica</i> (Lehm. & Lindenb.) Schiffn.	Lejeuneaceae
18.	<i>Lopholejeunea subfusca</i> (Nees) Schiffn.	Lejeuneaceae
19.	<i>Microlejeunea punctiformis</i> (Taylor) Steph.	Lejeuneaceae
20.	<i>Ptychanthus striatus</i> (Lehm. & Lindenb.) Nees	Lejeuneaceae
21.	<i>Spruceanthus semirepandus</i> (Nees) Verd.	Lejeuneaceae

# IDENTIFICATION OF SPECIMENS

Sl. No.	Name of the Species	Family
22.	<i>Frullania arecae</i> (Spreng.) Gottsche	Frullaniaceae
23.	<i>Frullania muscicola</i> Steph.	Frullaniaceae
24.	<i>Frullania nepalensis</i> (Spreng.) Lehm. & Lindenb.	Frullaniaceae
25.	<i>Frullania retusa</i> Mitt.	Frullaniaceae
26.	<i>Radula auriculata</i> Steph.	Radulaceae
27.	<i>Radula obscura</i> Mitt.	Radulaceae
28.	<i>Radula stenocalyx</i> Mont.	Radulaceae
29.	<i>Radula pocsii</i> K.Yamada	Radulaceae
30.	<i>Heteroscyphus beschernellei</i> (Steph.) S.Hatt.	Lophocoleaceae
31.	<i>Heteroscyphus coalitus</i> (Hook.) Schiffn.	Lophocoleaceae
32.	<i>Metacalypogeia alternifolia</i> (Nees) Grolle	Calypogieiaceae
33.	<i>Scapania ferruginea</i> (Lehm. & Lindenb.) Lehm. & Lindenb.	Scapaniaceae

# IDENTIFICATION OF SPECIMENS

Sl. No.	Name of the Species	Family
34.	<i>Scapania ornithopoides</i> (With.) Waddell	Scapaniaceae
35.	<i>Lepidozia reptans</i> (L.) Dumort.	Lepidoziaceae
36.	<i>Bazzania himalayana</i> (Mitt.) Schiffn.	Lepidoziaceae
37.	<i>Bazzania ovistipula</i> (Steph.) Abeyw	Lepidoziaceae
38.	<i>Bazzania tricrenata</i> (Wahlenb.) Lindb.	Lepidoziaceae
39.	<i>Bazzania tridens</i> (Reinw., Blume & Nees) Trevis.	Lepidoziaceae
40.	<i>Plagiochila flexuosa</i> Mitt.	Plagiochilaceae
41.	<i>Plagiochila fruticosa</i> Mitt.	Plagiochilaceae
42.	<i>Plagiochila khasiana</i> Mitt.	Plagiochilaceae
43.	<i>Plagiochila nepalensis</i> Lindenb.	Plagiochilaceae
44.	<i>Plagiochila parvifolia</i> Lindenb.	Plagiochilaceae
45.	<i>Plagiochila sciophila</i> Nees ex Lindenb.	Plagiochilaceae



# IDENTIFICATION OF SPECIMENS

Sl. No.	Name of the Species	Family
46.	<i>Plagiochila subtropica</i> Steph.	Plagiochilaceae
47.	<i>Pellia epiphylla</i> (L.) Corda	Pelliaceae
48.	<i>Dumortiera hirsuta</i> (Sw.) Nees	Dumortieraceae
49.	<i>Lunularia cruciata</i> (L.) Dumort. ex Lindb.	Lunulariaceae
50.	<i>Marchantia emarginata</i> Reinw., Blume & Nees	Marchantiaceae
51.	<i>Marchantia hartlessiana</i> Steph.	Marchantiaceae
52.	<i>Marchantia linearis</i> Lehm. & Lindenb.	Marchantiaceae
53.	<i>Marchantia paleacea</i> Bertol.	Marchantiaceae
54.	<i>Marchantia papillata</i> subsp. <i>grossibarba</i> (Steph.) Bischl.	Marchantiaceae
55.	<i>Marchantia subintegra</i> Mitt.	Marchantiaceae
56.	<i>Plagiochasma appendiculatum</i> Lehm. & Lindenb.	Aytoniaceae

# DESCRIPTION OF SPECIES

Prepared description of 40 species

Sl. No.	Name of the Species	Family
1.	<i>Acrolejeunea infuscata</i> (Mitt.) Jian Wang bis & Gradst.	Lejeuneaceae
2.	<i>Acrolejeunea recurvata</i> Mitt.	Lejeuneaceae
3.	<i>Cheilolejeunea trapezia</i> (Nees) Kachroo & R.M.Schust.	Lejeuneaceae
4.	<i>Cololejeunea latilobula</i> (Herzog) Tixier	Lejeuneaceae
5.	<i>Cololejeunea longiana</i> Grolle & Mizut.	Lejeuneaceae
6.	<i>Cololejeunea serrulata</i> Steph.	Lejeuneaceae
7.	<i>Cololejeunea trichomanis</i> (Gottsche) Steph.	Lejeuneaceae
8.	<i>Colura tenuicornis</i> (A.Evans) Steph.	Lejeuneaceae
9.	<i>Drepanolejeunea angustifolia</i> (Mitt.) Grolle	Lejeuneaceae

# DESCRIPTION OF SPECIES

Sl. No.	Name of the Species	Family
10.	<i>Drepanolejeunea erecta</i> (Steph.) Mizut.	Lejeuneaceae
11.	<i>Drepanolejeunea fleischeri</i> (Steph.) Grolle & R.L.Zhu	Lejeuneaceae
12.	<i>Drepanolejeunea herzogii</i> R.L.Zhu & M.L.So	Lejeuneaceae
13.	<i>Drepanolejeunea yunnanensis</i> (P.C.Chen) Grolle & R.L.Zhu	Lejeuneaceae
14.	<i>Lejeunea anisophylla</i> Mont.	Lejeuneaceae
15.	<i>Lejeunea curviloba</i> Steph.	Lejeuneaceae
16.	<i>Leptolejeunea subdentata</i> Schiffn. ex Herzog	Lejeuneaceae
17.	<i>Lopholejeunea subfusca</i> (Nees) Schiffn.	Lejeuneaceae
18.	<i>Microlejeunea punctiformis</i> (Taylor) Steph.	Lejeuneaceae
19.	<i>Frullania muscicola</i> Steph.	Frullaniaceae
20.	<i>Frullania nepalensis</i> (Spreng.) Lehm. & Lindenb.	Frullaniaceae
21.	<i>Frullania retusa</i> Mitt.	Frullaniaceae

# DESCRIPTION OF SPECIES

Sl. No.	Name of the Species	Family
22.	<i>Radula auriculata</i> Steph.	Radulaceae
23.	<i>Radula obscura</i> Mitt.	Radulaceae
24.	<i>Radula stenocalyx</i> Mont.	Radulaceae
25.	<i>Radula pocsii</i> K.Yamada	Radulaceae
26.	<i>Heteroscyphus bescherellei</i> (Steph.) S.Hatt.	Lophocoleaceae
27.	<i>Heteroscyphus coalitus</i> (Hook.) Schiffn.	Lophocoleaceae
28.	<i>Metacalypogeia alternifolia</i> (Nees) Grolle	Calyptogiaceae
29.	<i>Lepidozia reptans</i> (L.) Dumort.	Lepidoziaceae
30.	<i>Bazzania himalayana</i> (Mitt.) Schiffn.	Lepidoziaceae
31.	<i>Bazzania ovistipula</i> (Steph.) Abeyw	Lepidoziaceae
32.	<i>Bazzania tridens</i> (Reinw., Blume & Nees) Trevis.	Lepidoziaceae
33.	<i>Metzgeria consanguinea</i> Schiffn.	Metzgeriaceae

# DESCRIPTION OF SPECIES

Sl. No.	Name of the Species	Family
34.	<i>Plagiochila flexuosa</i> Mitt.	Plagiochilaceae
35.	<i>Plagiochila fruticosa</i> Mitt.	Plagiochilaceae
36.	<i>Plagiochila khasiana</i> Mitt.	Plagiochilaceae
37.	<i>Plagiochila nepalensis</i> Lindenb.	Plagiochilaceae
38.	<i>Plagiochila parvifolia</i> Lindenb.	Plagiochilaceae
39.	<i>Marchantia emarginata</i> Reinw., Blume & Nees	Marchantiaceae
40.	<i>Marchantia linearis</i> Lehm. & Lindenb.	Marchantiaceae



*Drepanolejeunea herzogii*



*Lejeunea flava*



*Lejeunea curviloba*



*Lejeunea tuberculosa*



*Leptolejeunea balansae*



*Leptolejeunea elliptica*



*Bazzania himalayana*



*Bazzania ovistipula*



*Plagiochila parvifolia*



*Pellia epiphylla*



*Dumortiera hirsuta*



*Lunularia cruciata*





*Marchantia hartlessiana*



*Marchantia linearis*



*Marchantia paleacea*



*Marchantia subintegra*



*Acrolejeunea recurvata*



*Drepanolejeunea angustifolia*



*Drepanolejeunea fleischeri*



*Leptolejeunea subdentata*



*Bazzania himalayana*



*Bazzania tridens*



*Plagiochila flexuosa*



*Plagiochila fruticosa*



*Bazzania ovistipula*



*Plagiochila khasiana*



*Scapania ferruginea*



*Scapania ornithopoides*

# STUDY OF LOAN SPECIMENS

Studied the following two specimens obtained on loan from National Botanical Research Institute, Lucknow, India (LWG):

- *Drepanolejeunea mawtmiana* Ajit P.Singh & V.Nath: A.P. Singh 208693B (isotype LWG)
- *Drepanolejeunea longifolia* Ajit P.Singh & V.Nath: S. Chandra 201213B (isotype LWG)

Studied the following specimen obtained on loan from Friedrich-Schiller-Universität Jena, Germany (JE):

- *Drepanolejeunea herzogii* R.L.Zhu & M.L.So: JE04002961 (Isotype)

Designated *Drepanolejeunea mawtmiana* as a new synonym of *Drepanolejeunea herzogii*.

# PUBLICATIONS

## Book:

MAJUMDAR S. AND DEY M. 2020. A Handbook on Bryophytes with Special Reference to Type Specimens of Liverworts and Hornworts in Indian Herbaria. ENVIS Resource Partner on Biodiversity, Botanical Survey of India, Kolkata. pp. 1–247.

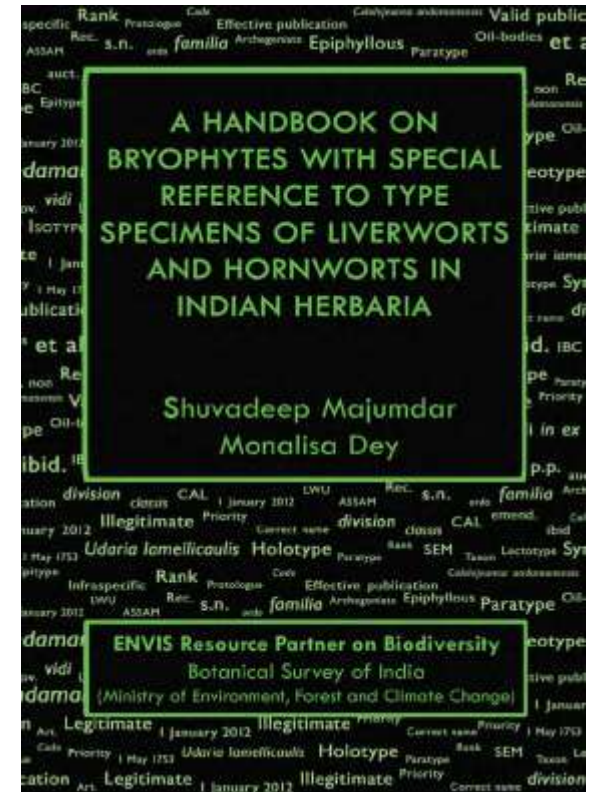
## Research papers:

Published : 02

- BHATTACHARJEE A., DEY M. AND BANDYOPADHYAY S. 2020. (034–035) Proposals to amend Article 9.6 and Example 6. *Taxon* 69 (6): 1384.
- MAJUMDAR S. AND DEY M. 2021. *Drepanolejeunea mawtmiana*, a new synonym of *Drepanolejeunea herzogii* (Lejeuneaceae: Marchantiophyta) with a note on the diversity of the genus *Drepanolejeunea* in India. *Journal of Bryology*, DOI: 10.1080/03736687.2020.1864893.

Accepted : 01

MAJUMDAR S. AND DEY M. Present status of Liverworts and Hornworts in India. *Annals of Plant Sciences*.



# WORK REMAINING

- Preparation of description of 18 species.
- Preparation of key to the species.
- Final compilation of the report.

# ACKNOWLEDGEMENTS

I am thankful to the Director, Botanical Survey of India and Head, Central National Herbarium for providing necessary facilities.

*Thank You*